ESD Hardware Option Manual

Integral Solutions Int'l

– EPS-100 –

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1. Hardware Description

ESD Hardware Option is designed as an add-on to ISI QST-200x testers to study sensitivity of magneto-resistive heads to electro static discharge. ESD stress can only be done at HGA level and can be run in either standalone mode or as part of QST test.

ESD option consists of EPS-100 and waveform module. EPS-100 is a power supply, capable of producing +/-100V with 0.003V resolution. It is universal for all waveform modules. Due to calibration for more precise HBM and MM amplitude, the waveform module may require voltages slightly higher than 100, which is not supported by EPS-100. Therefore the maximum HBM and MM firing voltage is +/-90V.

Waveform module is responsible for producing a pulse of a known shape (using one of the standard ESD models) and switching the head from stressing to testing. There are three standard types of waveform modules: Charge Device Model (CDM), Human Body Model (HBM), and Machine Model (MM). Newer waveform modules are located directly on the 2xHGA cartridge in close proximity to the head, and are called *cartridge-style*. Such modules can be run standalone or mounted on 2x tooling directly for testing.

Older type module is an add-on to QST that has two 6-pin cables running to standard QST 2xHGA cartridge, and is called a *box-style* module. HBM and MM box-style waveform modules do not support any AC measurements. These modules are no longer manufactured, however EPS-100 supports them as well. A special adapter board for EPS-100 is required to run the box-style waveform modules.

HBM and MM modules are universal for any flex design; custom mechanics that are required for different heads are located on the cartridge. So HBM and MM waveform modules can be freely interchanged on one cartridge. CDM waveform module on the other hand requires unique mechanical configuration for each flex design, and cannot be mounted on HBM/MM cartridge.

EPS option was designed to work with the automated ESD Sweep test. The test uses EPS to generate controlled ESD transients and measures head parameters between the pulses to find ESD failure threshold (voltage). Any QST-200x test, including AC measurements, can be used to characterize the head and find the ESD failure threshold. QST test requires a QST-200x and either 2xHGA tooling (for cartridge style waveform modules) or 8xHGA tooling for box-style. To enable this test, add *ESDApp.Application* to *Quasi97* → *Selected Modules* and enable it.

!Important!

It is not recommended to expose any waveform module to magnetic fields higher than 250Oe. When running QST tests with waveform module close to the magnet, make sure that magnetic field from the QST magnet does not cause field near waveform modules to exceed 200Oe.

On standard 2-pole HSA/HGA magnet the module is physically inside the magnet so 250Oe limit applies. However, other magnet design (for example 4-pole or 15K high field) can go to higher fields without affecting the waveform module due to smaller field leakage in the perimeter. For example QST-2002HF Tester and QST-2002 with Quad-Pole HGA Magnet can go to higher fields.

!Important!

The diodes on Gen2 2xHGA cartridges must be removed in order to work properly with Machine Model (MM) and Human Body Model (HBM) ESD modules. So the "MR Clamping During Write" feature is not supported by the HBM/MM Gen2 type cartridges. User must remember the fact that the QST-2002 tester cannot recognize if the diodes are present or not, so "MR Clamping During Write" even though available in software, will not work. The diode protection still exists on the 2xHGA GEN2 interface board, using programmable clamping voltage, but it is enabled in both write and read modes.

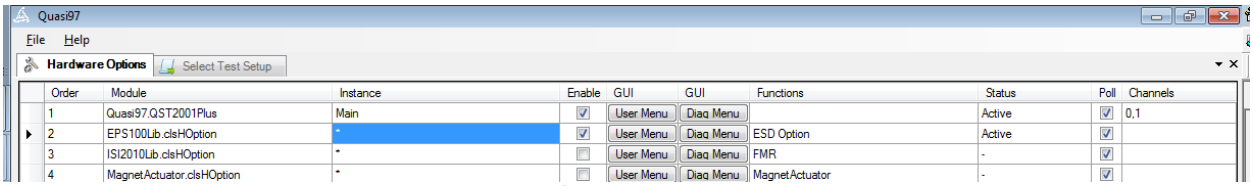
!Important!

On Gen2 2xHGA type cartridges, for HBM and MM, the DC cable makes a slight impact on the waveform with higher resistance read heads. While it is recommended to have it for higher accuracy measurement, it has negative impact on the amplitude of the HBM waveform (HBM peak on 500ohm reader is ~5% higher with the DC ribbon cable because of additional capacitance). In order to avoid this phenomena, the DC ribbon cable between the cartridge and HGA connector board can be removed. In this case the cartridge needs to be reworked as follows:

1) On HGA connector board - remove the R5 and R7.
2) On the G2 2x Universal Cartridge board, install 0ohm resistors on R5-R10.

2. Installation

1. Install the NI-DAQ PCI-6503 in one of available PCI slots in the computer.
2. Connect EPS-100 to the NI-Daq card using a 50-pin ribbon cable.
3. Connect the waveform module to the EPS-100 using 26-pin cable.
4. Plug in EPS-100 power supply to a standard 115VAC outlet.
5. Turn on the PC, and run Quasi97. Go to File→Hardware Config. Add one line item, select for module type EPS100Lib.clsHOption, * in the instance column and ESD Option in the function column.


Quasi97
File Help
Hardware Options
Select Test Setup
Order Module Instance Enable GUI GUI Functions Status Poll Channels
1 Quasi97.QST2001Plus Main User Menu Diag Menu Active 0,1
2 EPS100Lib.clsHOption * User Menu Diag Menu ESD Option Active
3 ISI2010Lib.clsHOption * User Menu Diag Menu FMR -
4 MagnetActuator.clsHOption * User Menu Diag Menu MagnetActuator -

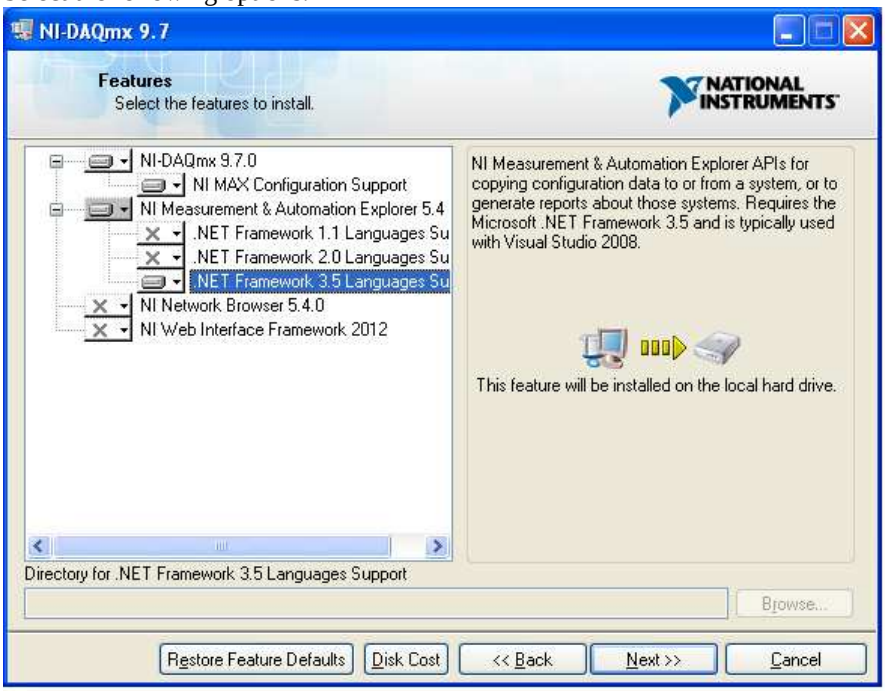
6. Select a setup file. In the Add-Ins→Selected modules, enable ESDApp.application.

7. ESD option is ready. You can fire single pulses from File→HardwareConfig→EPS100Lib User menu, or run an ESD Sweep test.

If you are installing the EPS-100 option on the new PC, you need to install the NIDAQmx 9.7 software. The NIDaqmx Core link is available on www.us-isi.com – this is the bar minimum required to run.

There is also an option to install full version of NIDAQmx. This can be downloaded from National Instruments website. If installing full NIDAQ version, then following must be done:

1) Select the following options.


NI-DAQmx 9.7
Features
Select the features to install.
NATIONAL INSTRUMENTS
NI-DAQmx 9.7.0
NI MAX Configuration Support
NI Measurement & Automation Explorer 5.4
.NET Framework 1.1 Languages Su
.NET Framework 2.0 Languages Su
.NET Framework 3.5 Languages Su
NI Network Browser 5.4.0
NI Web Interface Framework 2012
NI Measurement & Automation Explorer APIs for copying configuration data to or from a system, or to generate reports about those systems. Requires the Microsoft .NET Framework 3.5 and is typically used with Visual Studio 2008.
This feature will be installed on the local hard drive.
Directory for .NET Framework 3.5 Languages Support
Browse...
Restore Feature Defaults
Disk Cost
<< Back
Next >>
Cancel

2) After Installing the NI-DAQ software, run "Measurement and Automation Explorer" from your Desktop.
3) Go to "Devices and Interfaces", click "View"-->"Refresh".

4) The new PCI-6503 card should appear on the list. Click on the PCI-6503 card, then "Properties" - the software will verify the card.
5) After than close Measurement and Automation Explorer and Start Quasi97.

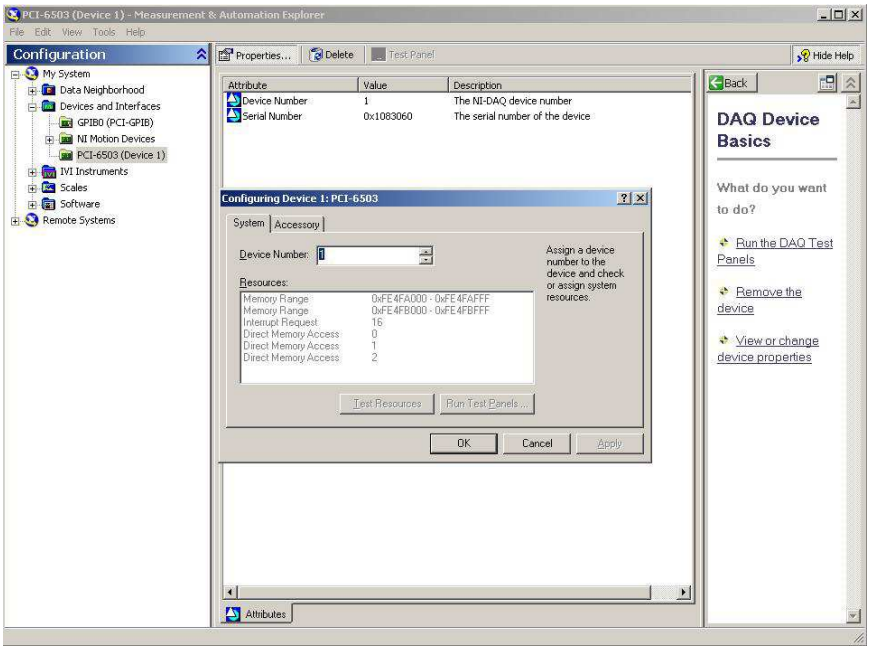


Figure 2-1 – Measurement and Automation Explorer

The 50pin ribbon cable with the choke between QST Universal Interface and 2xHGA tooling is to reduce AC noise on 2xHGA ESD option. It should be used if ESD Option is installed, and does not have any effect on standard non-ESD cartridgees.

2xHGA Gen2 Users:

For CDM ESD test, you should have a special cartridge that does not have DC cables and connectors installed. The CDM cable splits into 2 AC cables (write and read) that should be connected to the back of the cartridge.

For MM/HBM ESD test, you should reuse the non-ESD cartridge. You have to disconnect the 4 AC cables, then install a shim and put on the ESD waveform module. Then connect the waveform module to the cartridge via Y-type AC cable. Then connect the waveform module to the Connector board via 1" Y-Type AC cable. The DC cables should remain connected.

3. Maintenance

Approximated lifetime of the relay on DCDM modules is 100,000 cycles. HBM and MM modules are less sensitive to a small change of capacitance in the relay, and will work longer without changing it. Performance of your waveform module should be monitored periodically, and, if necessary, the module should be sent back to ISI for relay replacement or calibration. Follow calibration procedures to ensure performance of your ESD Stress system.

There is a 100mA SLO-BLO fuse on the AC input.

4. Charge Device Model (CDM)

4.1 Mechanical Alignment

According to CDM standard, the head's suspension must be grounded. In most cases suspension holder serves that purpose, while in other, the suspension is pressed against CDM chassis by flex clamp.

Unlike HBM or MM modules, CDM cartridge requires the flex to be directly connected to the board. That is why mechanical alignment of CDM cartridge may be counterintuitive. The pads on the flex must be facing the board, so for some cases, the head will be mounted ABS side up. The head will still be kept horizontal (90° to the transverse field).

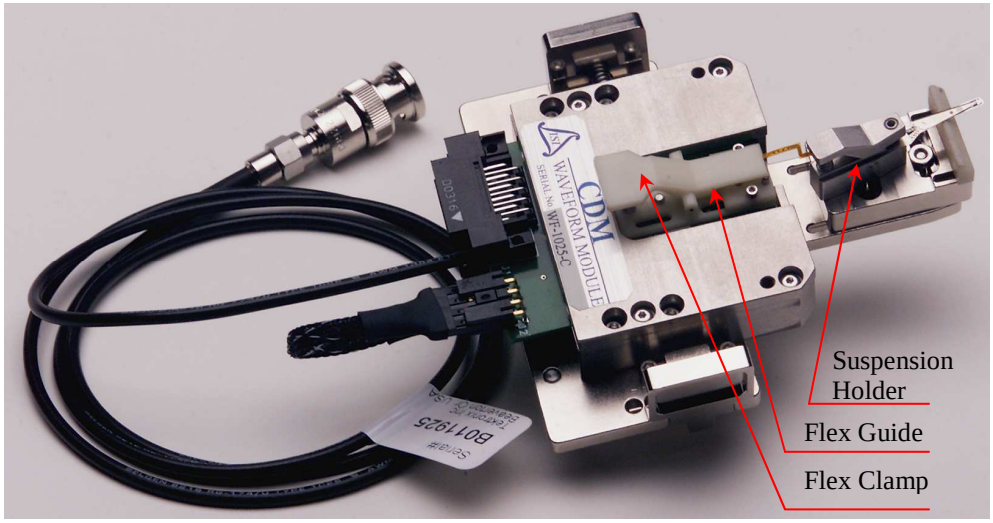


Figure 4-1 CDM Mechanical Alignment

Up/Down head reconfiguration involves changing the flex guide and realigning the suspension holder. Align the suspension holder so that the head's flex is on the centerline of the CDM tooling and the lies on the 2(4) pogo pins.

Usually ISI ships two flex guides for Up/Down heads: user needs to remove the two screws holding the flex guide and change it. Head's flex should always lie on the 2(4) pogo pins, on the centerline of CDM tooling. If screws from the flex guide are missing the user should remove the pins and put them into different pinholes to match head type.

CDM cartridge can support heater, but a special cable should be used (that connects to pins 3 and 4 of the Write port on the 2xCartridge). Use "Static Test"."Aux Point Test" to measure resistance of the heater in ESD and non-ESD configuration.

Note for 4-Pole magnet applications

On DCDM the flex is centered, but the suspension (and therefore HGA) is pivoted. This means there may be an offset (top view) of both the UP and DN sliders, and each may be at an angle (mirror image top view). The offset user can manually compensate by moving the magnet left or right. However, the angle will be an issue. For Transverse testing this is no problem, assuming the MR itself is centered in the gap. But for rotating fields the head will see different result than if the head was placed perpendicular into the gap.

So for Quad-Pole and HGA-only magnets user must ensure that the MR-element is within the uniform zone of the magnet gap. Secondly, Transverse-only field is recommended if the suspension is at any angle to the magnet other than 90degrees.

4.2 Monitoring Waveform

CDM waveform module charges the head to desired voltage and then grounds it, which creates a very fast current transient from the charge accumulated on the head. The pulse is very fast with the rise time up to 500pS and pulse width up to 1nS. The screenshot below is 5V CDM pulse, fired into a real head.

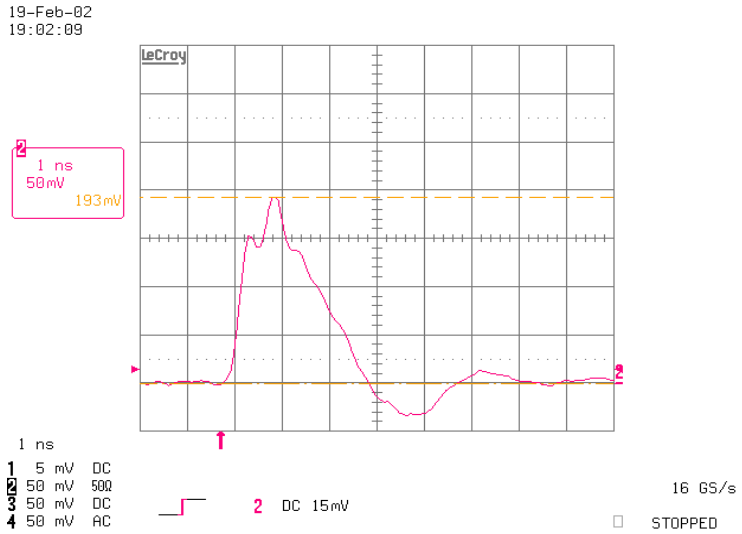


Figure 4-2 Monitoring CDM Pulse (fired into real head)

The shape and amplitude of the pulse you see on the screenshot is going to depend on the electrical properties (capacitance) of the head.

The CT-6 probe comes standard with CDM cartridge and should be ready for monitoring the waveform. Simply connect the CT-6 current probe from CDM waveform module to the oscilloscope.

If CT-6 is not installed, we recommend sending it to ISI. If that is not possible, here is the procedure on how to do it:

Separate the waveform module from the 2x cartridge, by removing 4 screws that are not covered in black.

Fix the waveform module as shown on the picture (right).

Push the CT-6 probe through the opening on the bottom, up towards the copper wire.

Unsolder the copper wire on the right end. Insert wire through the CT-6 probe and re-solder.

Mount DCDM waveform module back on the cartridge.

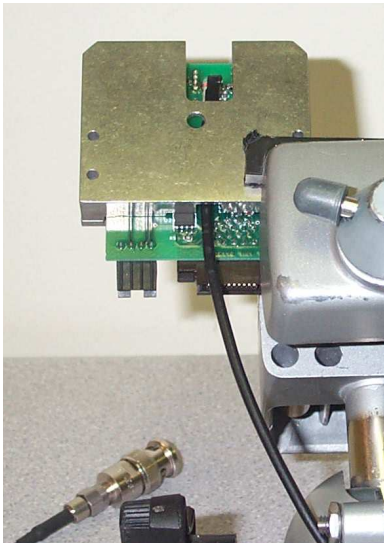


Figure 4-3 CDM CT-6

4.3 ESD Standard

The standard shown here applies to pulses produced by ISI DCDM waveform modules and should treated as such. The values should be used for verification of the CDM waveform module device with 5pF and 12pF calibration capacitors.

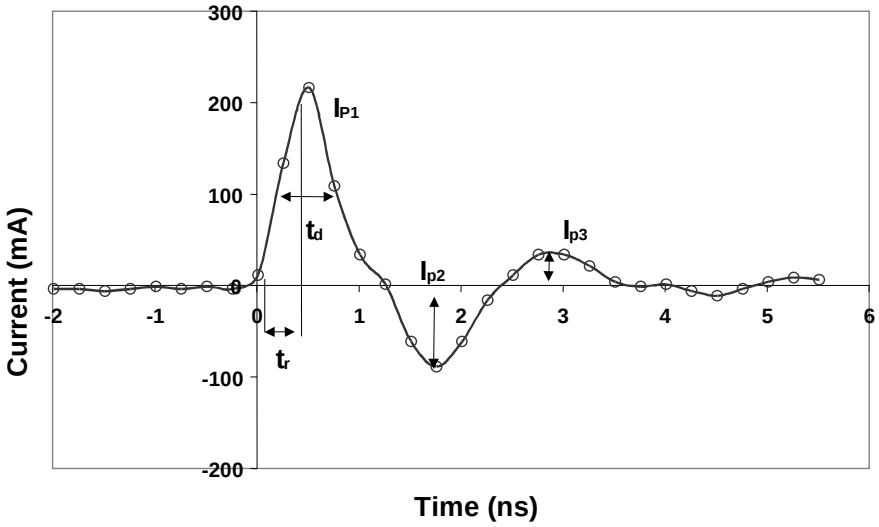


Figure 4-4 CDM Standard [1]

Ip1 can be estimated as 11mA/V CDM for 5pF capacitor and 13mA/V CDM for 12pF at 10V CDM or higher. The real peak current at lower voltages (such as 1V CDM) is around 8mA/V and 12mA/V for 5pF and 12pF capacitors. Use the following table to verify performance of your CDM module.

Ip1 / CDM Voltage	Nominal	Minimum	Maximum
	5pF Calibration Capacitor		
1	8.2	6.6	9.8
10	104.5	83.6	125.4
20	215.6	172.5	258.7
	12pF Calibration Capacitor		
1	10.4	8.3	12.5
10	130.9	104.7	157.0
20	268.2	214.6	321.8

Other parameters can be checked at 10V CDM:

	Symbol	5pF	12pF
Rise Time (10% – 90% of Ip1)	t_r	<0.5 ns	<0.6 ns
Width at 50% of Ip1	t_d	700 ps	1000 ps[2]
Max 2nd peak	Ip_2	<50% Ip_1	<50% Ip_1
Max 3rd peak	Ip_3	<25% Ip_1	<25% Ip_1

The values above were measured using LeCroy LC574A 1Ghz oscilloscope. We expect that faster oscilloscope would show slightly higher amplitude and smaller pulse width.

[1] Figure taken from *Standardized Direct Charge Device ESD Test For Magneto resistive Recording Heads II*. Lydia Baril, Tim Cheung, Albert Wallash.

[2] The waveform rise time and width is overall 5% higher at bar CDM then on 2xHGA, because calibration capacitor is mounted in different location.

The following plot shows real 20V CDM discharge on 5pF calibration capacitor.

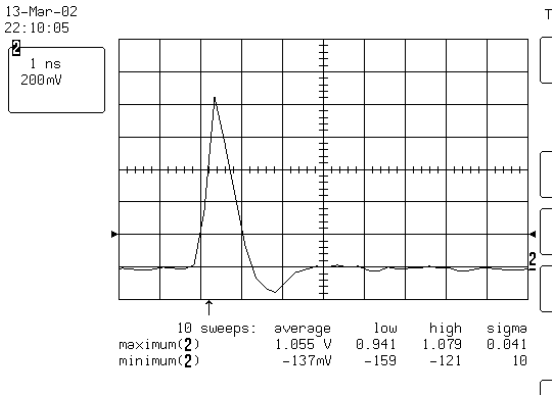


Figure 4-5 CDM Waveform (5pF Capacitor)

4.4 Calibration

Use one of the calibration capacitors to verify the CDM waveform. Turn on the EPS-100. If running Quasi97 software then exit from it and run EPS-100 application. Also remove the CDM cartridge from the 2xHGA tooling.

To install a calibration board, remove the HGA flex clamp and flex guide for Up/Down Heads from the cartridge. Pull out a pin from plastic base (where you put in the flex of HGA); the HGA clamp along with the spring should come out. If flex guide is held by two screws then remove them and pull out the flex guide. If flex guide is glued then remove the locating pins from it. You should have a cartridge with 2 or more uncovered pogo pins.

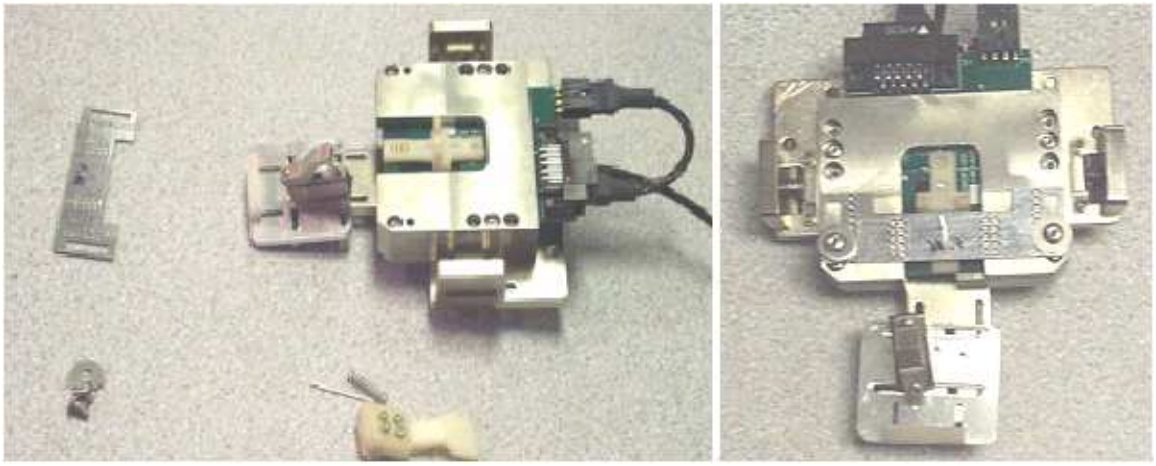


Figure 4-6 CDM Cartridge Calibration

Put the calibration board on top of the pogo pins. The calibration capacitor board should reside on two reader pogo pins and contact the CDM chassis on the sides. So when installing it make sure that the *two* MR pogo pins *do* contact the metal portion of the disk capacitor and writer pins *do not*. There are two methods of locating the calibration capacitor:

If there is a pinhole before pogo pin 1, insert the pin that you removed earlier in that hole through the calibration board (use the pin to guide the calibration board to the proper location).

If a guide hole (or a pin) is not available then use an ohmmeter to locate the calibration board. To do that, restart EPS-100 software; connect the ohmmeter to pins 1 and 2 of J2 connector, and continuously measure resistance while moving the calibration capacitor until you get less than 1 Ohm. After that, check resistance between pins 2 and 3 to make sure that R+ and W- are not connected.

Put 2 screws with washers on two sides of the calibration board to hold it in place and to connect the topside of the board with the CDM chassis. Fire a 1, 10 and 20V pulses and verify the amplitude, pulse width and rise time against CDM standard.

BlazerX5 version of the CDM waveform module has pogopins on the other side of the board. For verification of the waveform, the module has to be mounted on the support plate and the calibration disk should be mounted on a shim, as shown on the picture below.

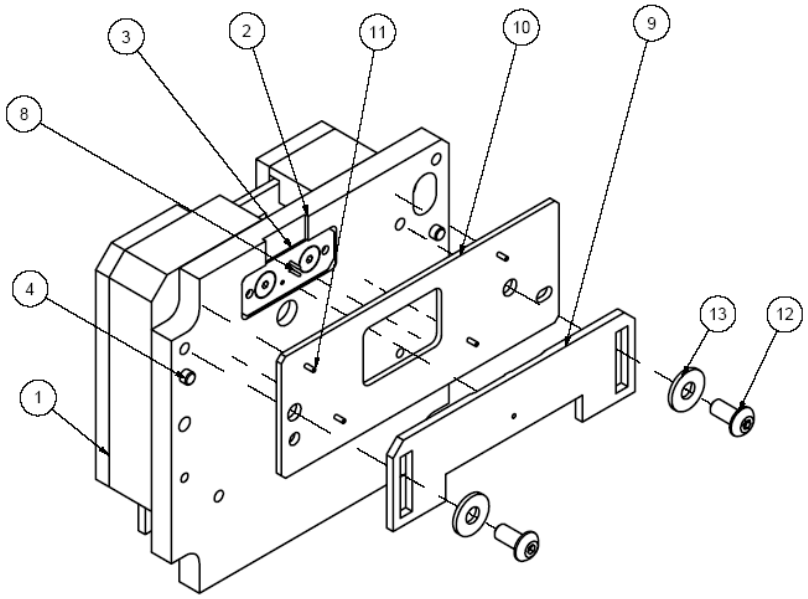


Figure 4-7 BlazerX5 CDM Calibration

1	CDM Waveform Module
2	Support Plate
9	Calibration Disk
10	Special Shim
12	Screw
13	Flat washer

4.5 CDM Operation

The following block diagram is provided for better understanding of the operation of the waveform module. It is created to show the charge device model ESD standard. The actual waveform module circuit may be slightly different.

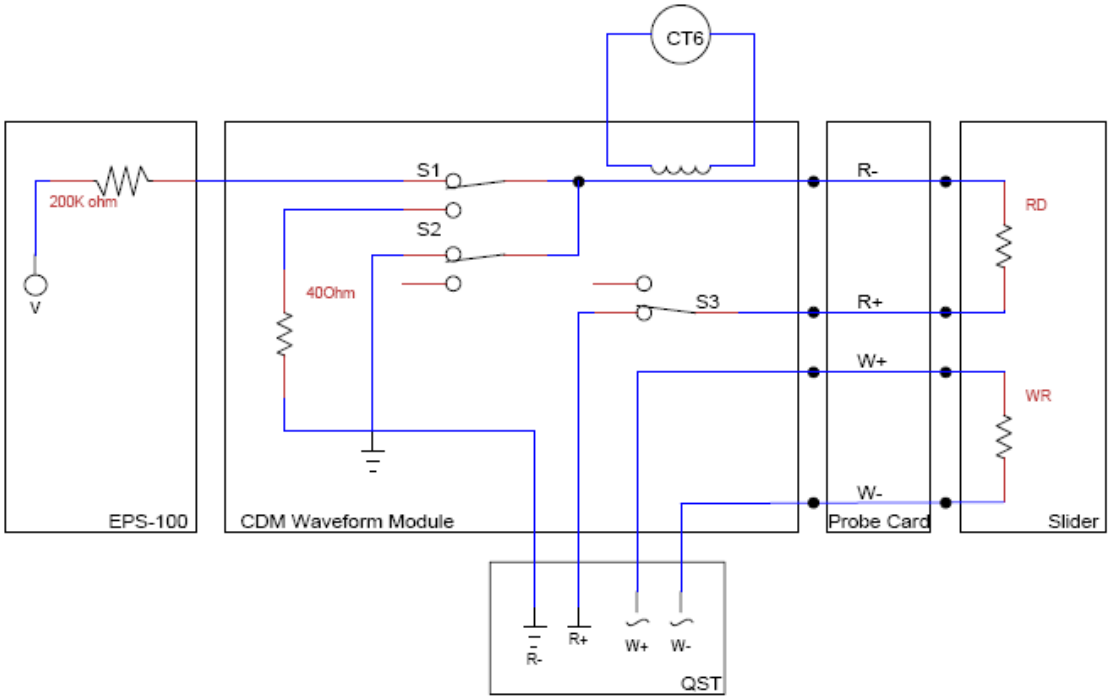


Figure 4-8 CDM Block Diagram

To fire pulse:
1) S1-UP, S2-DN, S3-UP
2) wait 100mS
3) S1-DN

To test:
1) S1-DN, S2-UP, S3-DN

5. Machine Model (MM)

5.1 Mechanical Alignment

MM cartridge does not require a special mechanical alignment. It connects to the board with pogo pins on the cartridge through a short cable. The waveform module can be connected to only one head at a time. In the case where cartridge has two pogo-pin boards for up and down heads, connect the cable from one or the other board to the waveform module.

Figure 5-1 MM / HBM Mechanical Alignment

To switch from MM to HBM, simply remove the two screws on the topside of the waveform module and disconnect three cables from it (EPS-100 cable, QST and pogo-pin board connection). The waveform module should come off and you can install another one (HBM or MM) in its place.

On 2xHGA Gen2 HBM/MM ESD cartridges do support heater testing (the aux bias current goes though the DC cables). Use "Static Test"."Aux Point Test" to measure resistance of the heater in ESD and non-ESD configuration.

5.2 Monitoring Waveform

To monitor current going through the head install a CT-1 probe on the wire going from J4 Pin2 on the cartridge-style waveform module to the FIC board. For the box-style modules mount CT-1 on the wire going from pin2 of "HEAD" connector on waveform module.

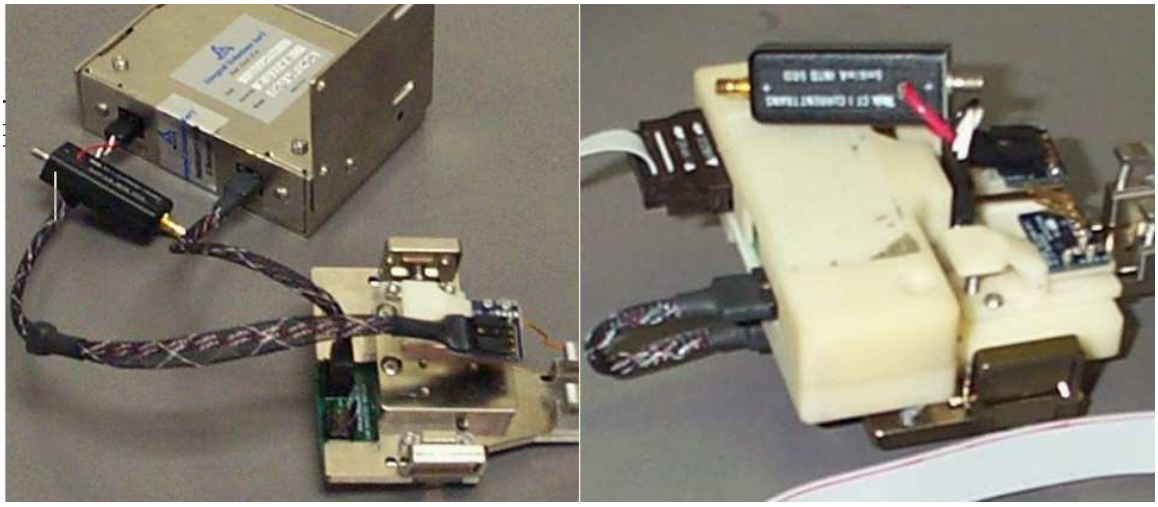


Figure 5-2 Monitoring MM Pulse

The following screenshot shows a 10V discharge into 500Ohm resistor.

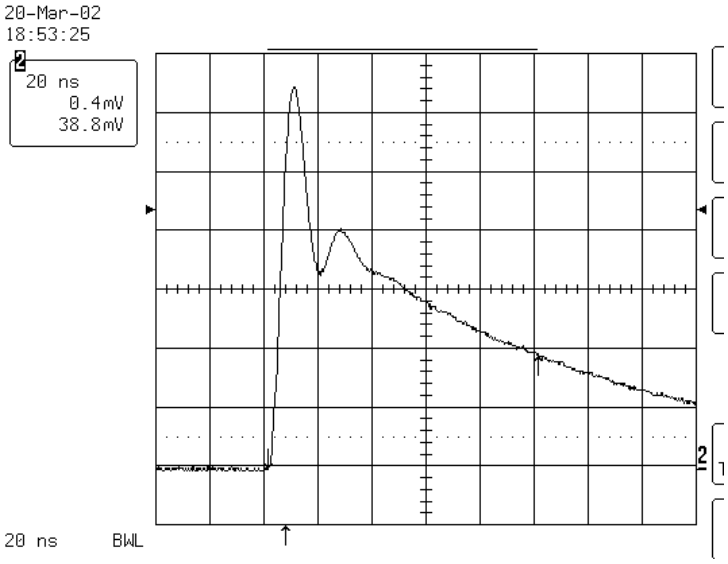
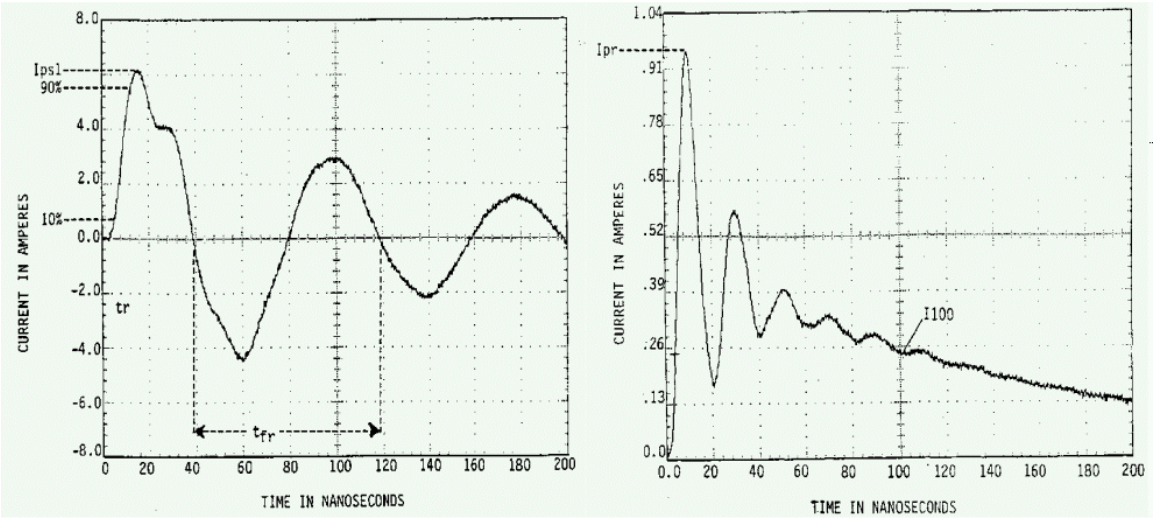


Figure 5-3 MM 500Ω Discharge

5.3 ESD Standard

Machine Model charges a 200pF capacitor and fires the accumulated charge into the head. The standard shown here applies to pulses produced by ISI MM waveform modules and should treated as such.



Voltage Level	(V)	10
Positive I_{PEAK} for Short, I_{PS1}	(mA)	150 – 200
Current at 100ns for 500Ω I_{100}	(mA)	7.25 +/- 20%
Maximum Positive I_{PEAK} for 500Ω I_{PR}	(mA)	I_{100} * 4.5
Maximum Ringing Current, I_R	(mA)	I_{PS1} * 30%
Resonance Frequency for Short, FR ($1/t_{fr}$)	(MHz)	11–15

Figure 5-4 Short and 500Ω MM Standard [3]

[3] Figure Taken from *EIA/JEDEC Standard. Test Method A115-A. Electrostatic Discharge Sensitivity Testing Machine Model (HBM). Revision EIA/JESD22-A115.*

5.4 Calibration

To verify calibration of the machine module, mount a CT-1 probe to monitor the ESD pulse. Connect a 0Ω resistor instead of the head and fire a 10V pulse. Verify the peak amplitude and ringing frequency against that in the MM spec. Connect a 500Ω resistor and fire a 10V pulse. Check that amplitude and current at 100nS conforms to Machine Module specification.

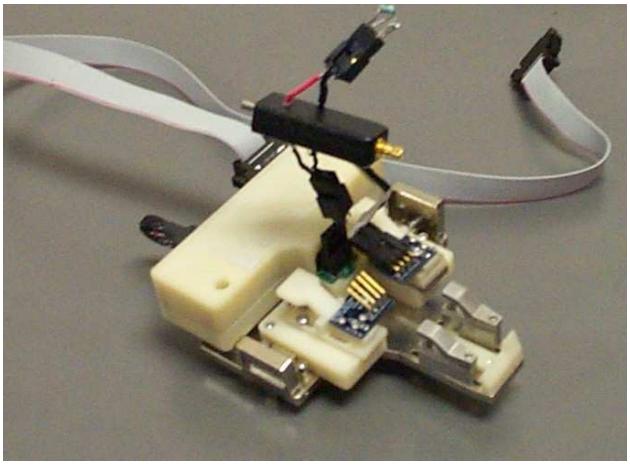


Figure 5-5 New-Style MM-HBM Calibration

The picture above shows the cartridge-style machine module prepared for calibration. See HBM calibration for a picture of box-style waveform module calibration. Note that the same ESD waveform specification applies to both cartridge and box – style MM.

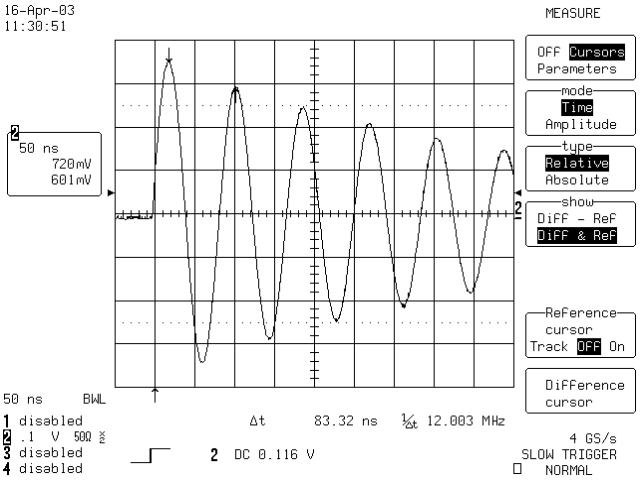


Figure 5-6 MM 10V Discharge into a 0Ohm Resistor

5.5 MM Operation

The following block diagram is provided for better understanding of the operation of the waveform module. It is created to show the machine model ESD standard. The actual waveform module circuit may be slightly different.

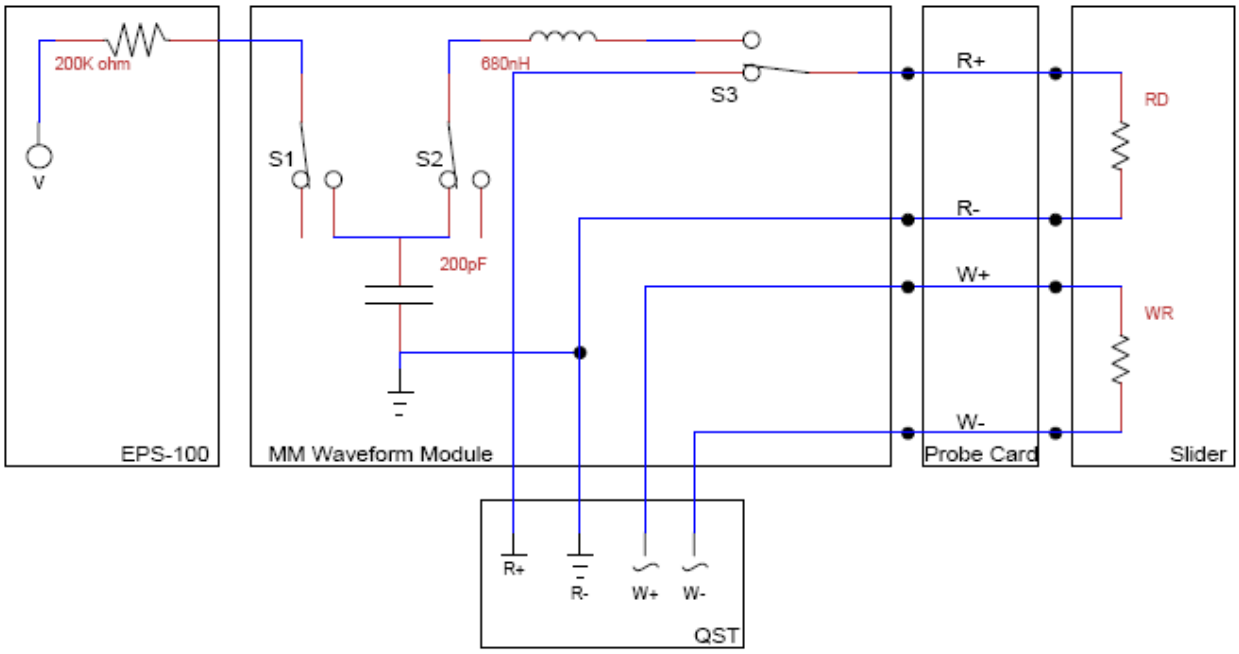


Figure 5-7 MM Block Diagram

To fire pulse:
1) S2-Right, S1-Right, S3-Up
2) wait 100mS
3) S2-Left

To test device:
1) S3-DN

6. Human Body Model (HBM)

6.1 Monitoring Waveform

Capturing the waveform of HBM pulse requires the same setup as on Machine Model. To monitor current going through the head install a CT-1 probe on the wire going from J4 Pin2 on the cartridge-style waveform module to the FIC board. For the box-style modules mount CT-1 on the wire going from pin2 of "HEAD" connector on waveform module.

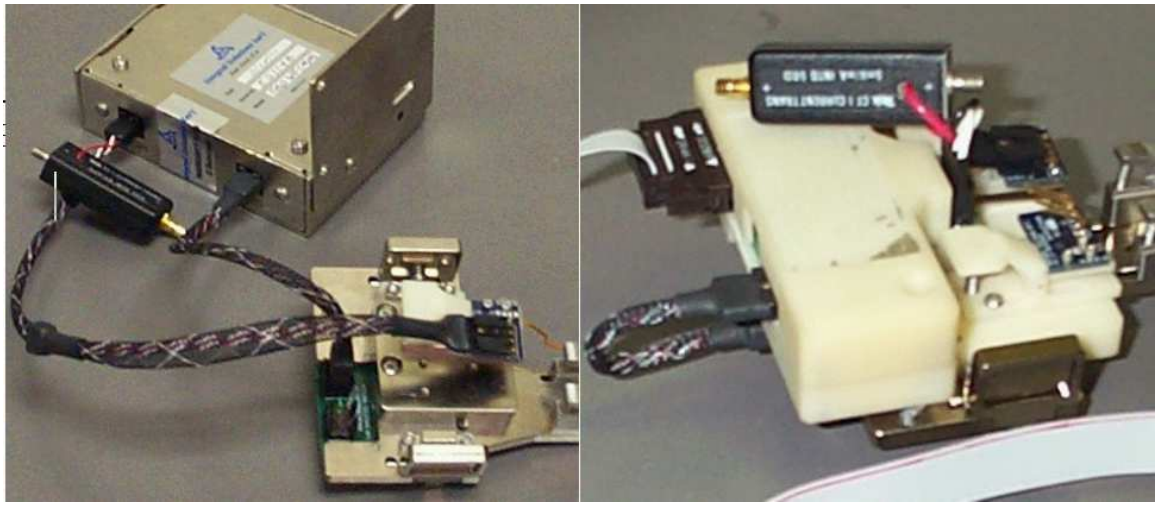


Figure 6-1 Monitoring HBM Pulse

HBM/MM ESD catridge do support heater testing (the aux bias current goes though the DC cables). Use "Static Test"."Aux Point Test" to measure resistance of the heater in ESD and non-ESD configuration

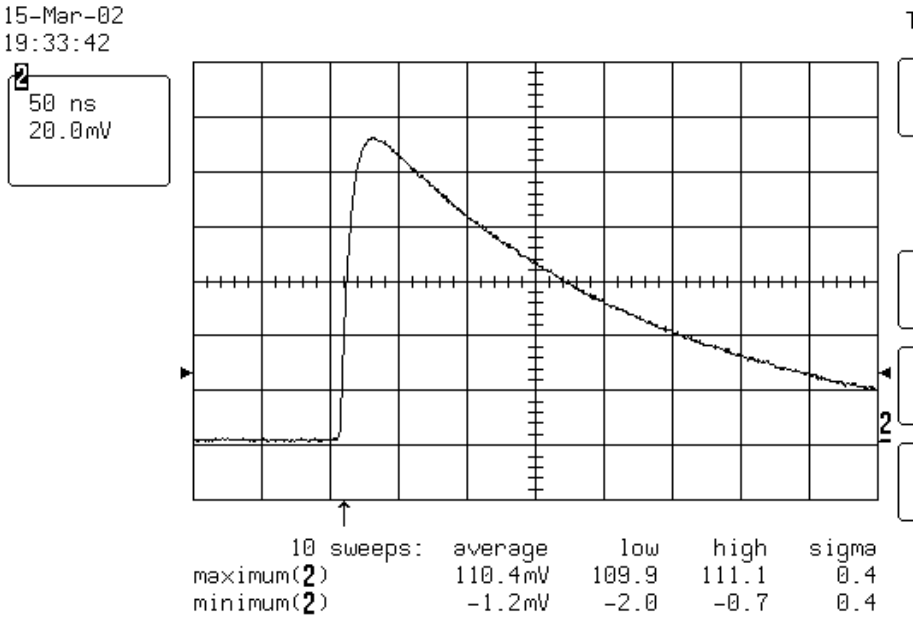
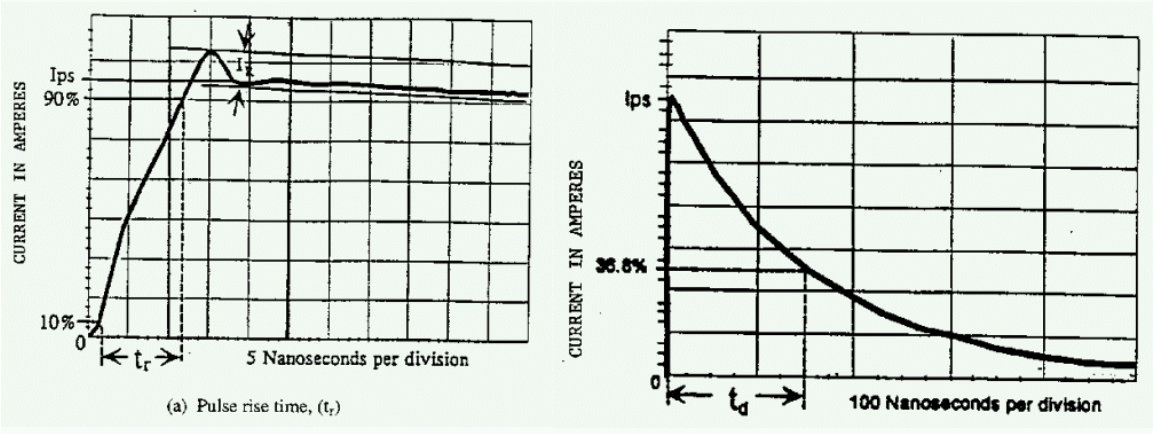


Figure 6-2 HBM 50V with 500Ohm Resistor

6.2 ESD Standard

Human Body Model charges 100pF capacitor and fires accumulated charge through the 1500Ω resistor into the head. The standard shown here applies to pulses produced by ISI HBM waveform modules and should treated as such.



Voltage Level	(V)	7	50
$I_{P0\Omega}$ (MR) for Short	(mA)	4.2 – 5.15	30 – 36.7
$I_{P500\Omega}$ (MR) for 500Ω	(mA)	2.63 – 4.2	18.75 – 30
V_{PEAK} (on R1) [4] *for Short (I_{PEAK} *1500/1000)*	(V)	6.3 – 7.7	45 – 55
*V_{PEAK} (on R1) for 500Ω (I_{PEAK} *(1500+500)/1000)*	(V)	5.25 – 8.4	37.5 – 60
Rise Time for Short (t_r)	(nS)	2 – 10	
Rise Time for 500Ω	(nS)	5 – 25	
Decay Time for Short (t_d)	(nS)	130 – 170	
Decay Time for 500Ω	(nS)	160 – 240	
Ringing Current (I_R)	(mA)	15% of I_{PS}	

Figure 6-3 Short and 500Ohm HBM Standard [5]

[4] R1 is 1500Ω Resistor in series with the MR head inside the HBM waveform Module. Vpeak is directly proportional to Ipeak, and the formula can be used to calculate real HBM voltage applied.

[5] Figure Taken from *EIA/JEDEC Standard. Test Method A114-A. Electrostatic Discharge Sensitivity Testing Human Body Model (HBM). Revision EIA/JESD22-A114.*

6.3 Calibration

To verify calibration of the human body module, mount a CT-1 probe to monitor the ESD pulse. Connect a 0Ω resistor instead of the head and fire a 7V and 50V pulse. Verify the peak amplitude, rise and decay times against the HBM spec. Connect a 500Ω resistor and fire a 7 and 50V pulses. Verify the waveform characteristics with the spec.

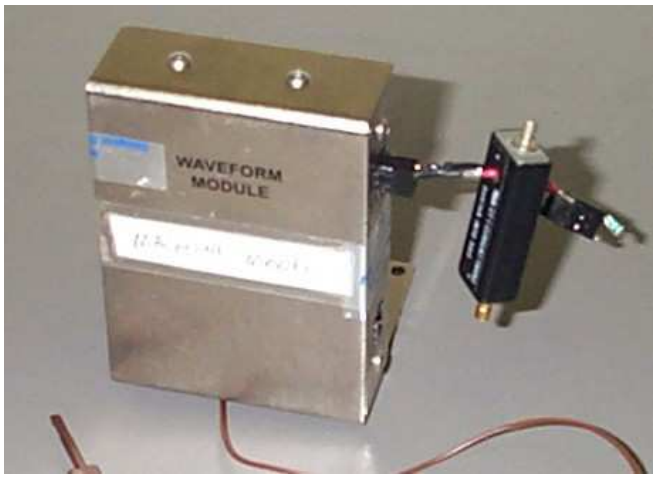


Figure 6-4 Old-Style MM-HBM Calibration

The screenshot above shows the box-style HBM prepared for calibration. See MM calibration for screenshot of cartridge-style waveform module calibration. Note that the same ESD waveform specification applies to both box and cartridge – style HBM.

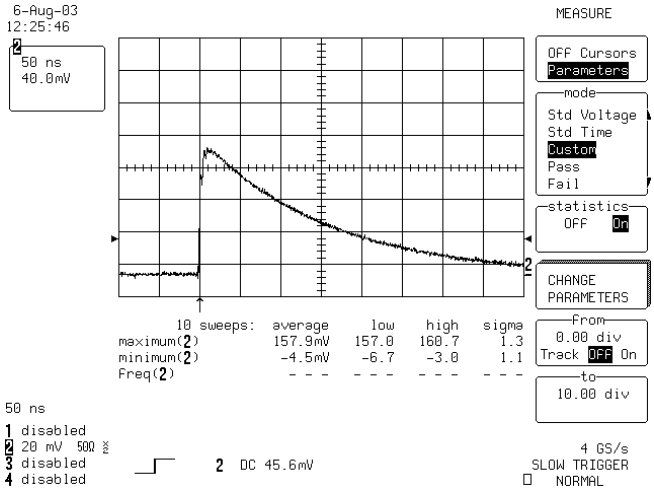


Figure 6-5 Real HBM Discharge on 0Ohm resistor

6.4 HBM Operation

The following block diagram is provided for better understanding of the operation of the waveform module. It is created to show the human body model ESD standard. The actual waveform module circuit may be slightly different.

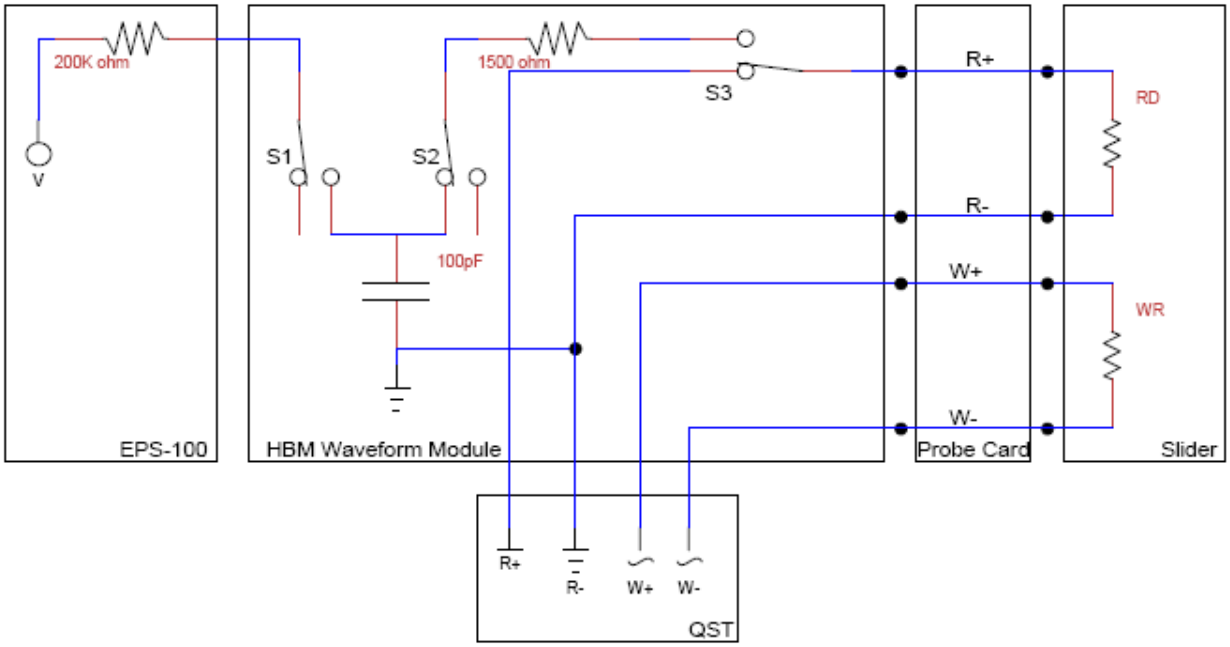


Figure 6-6 HBM Block Diagram

To fire pulse:
1) S2-Right, S1-Right, S3-Up
2) wait 100mS
3) S2-Left

To test device:
1) S3-DN

7. ESD Sweep Test

ESD option allows you to fire a sequence of pulses and monitor head performance during the sweep. To enable it run Quasi97, go to Add-Ins Modules and enable ESDApp.application. ESDApp is a test that will use your ESD option to fire pulses into the head and will run transfer curve (or any other test) to see how the head had degraded.

It is not recommended to expose any waveform module to magnetic fields higher than 250Oe. When running QST tests with waveform module close to the magnet, make sure that magnetic field from the QST magnet does not cause field near CDM waveform module to exceed 200Oe.

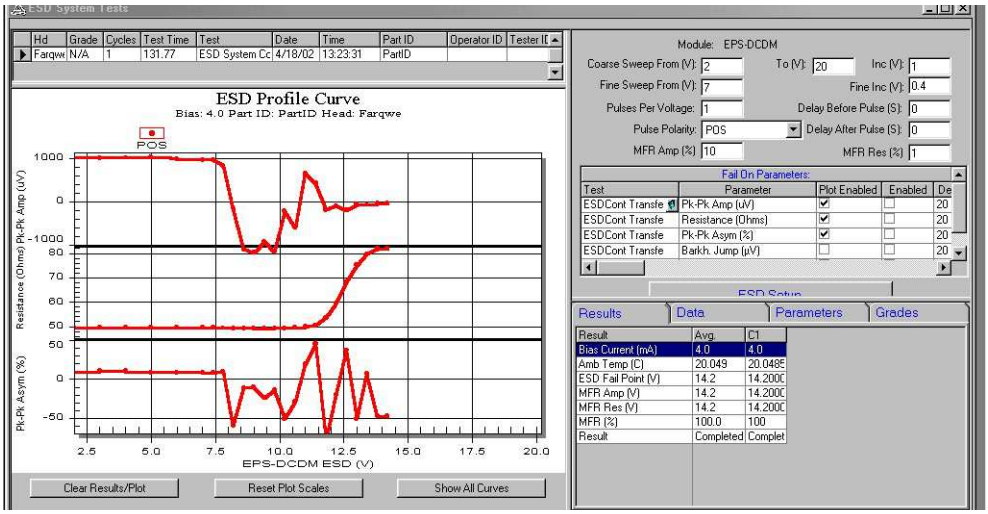


Figure 7-1 ESD Sweep

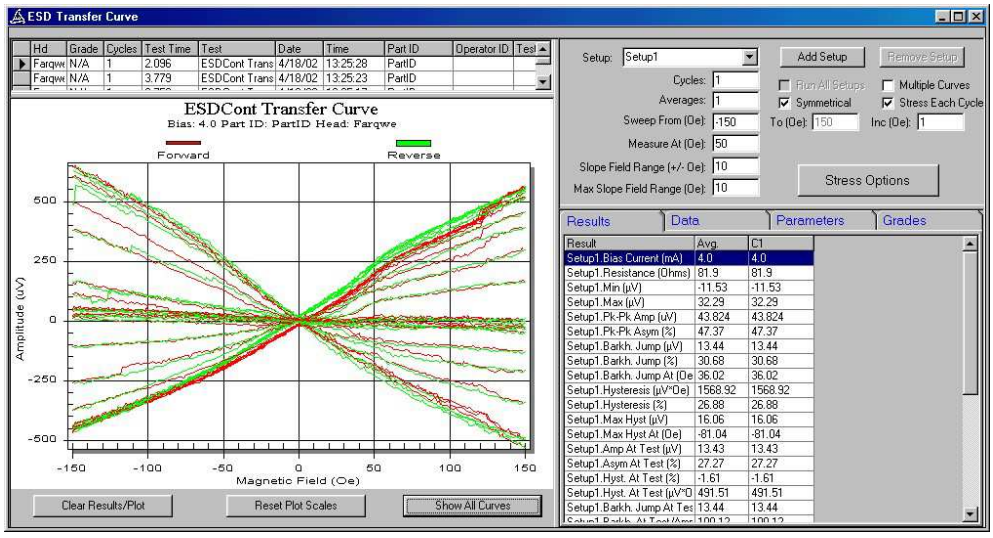


Figure 7-2 ESD Sweep Transfer Curve Plot

See Quasi97 External Tests manual for more information how to ESD Sweep test.

8. Bar ESD Stress Option

The ESD Stress option can also be mounted on the BlazerX5 bar tester, for testing heads while they are still on the row bar. This arrangement requires standard PCI-6503 card and EPS-100 modules. It also required modified waveform module, stress probe card base and stress probe card.

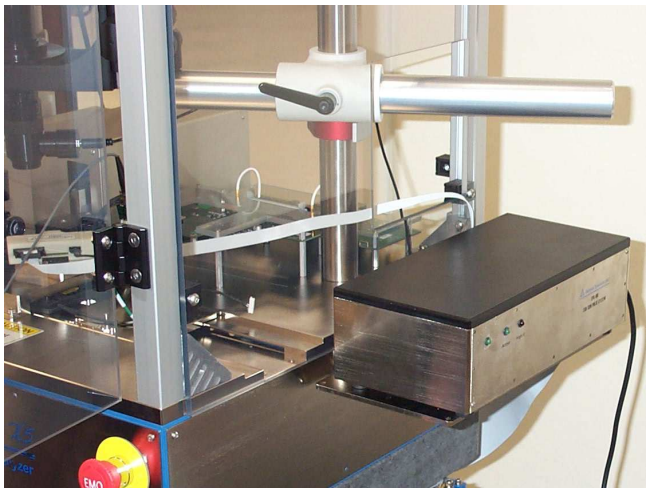


Figure 8-1 Bar ESD Stress Option

This manual will describe the installation of the ESD stress option onto the BlazerX5 bar tester, instructions on changing the waveform module and monitoring the ESD waveform. For ESD Stress probe card alignment and setting up stress positions, please refer to BlazerX5 Users Manual.

8.1 Bar ESD Option Installation

For installation turn off the BlazerX5.

1. Install PCI-6503 card in one of the available PCI slots in the comuter
2. Install the shelf for EPS-100 on the right side of the tester (leaving the 50pin ribbon cable between the shelf then the right panel of the Blazer).

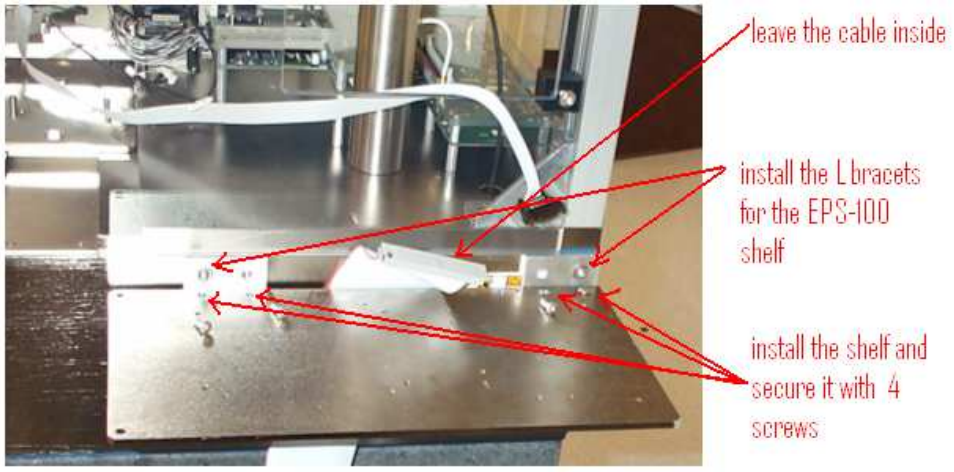


Figure 8-2 EPS-100 BlazerX5 Installation

3. Route the ribbon cable into the lower frame and connect to the PCI-6503 card inside the computer. Connect the AC power to the EPS-100.

Figure 8-3 EPS-100 BlazerX5 Installation (2)

4. Mount the EPS-100 on the shelf and connect all cables to it.

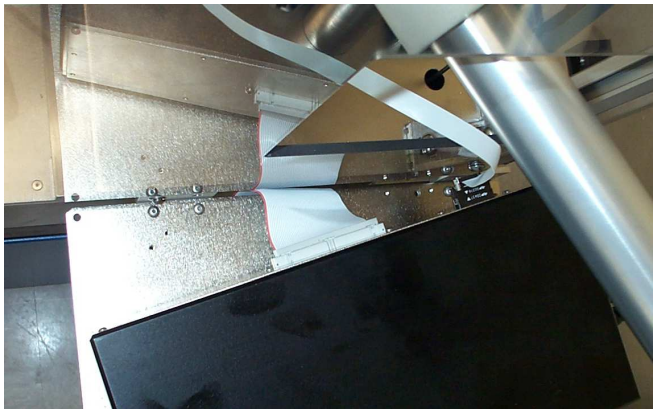
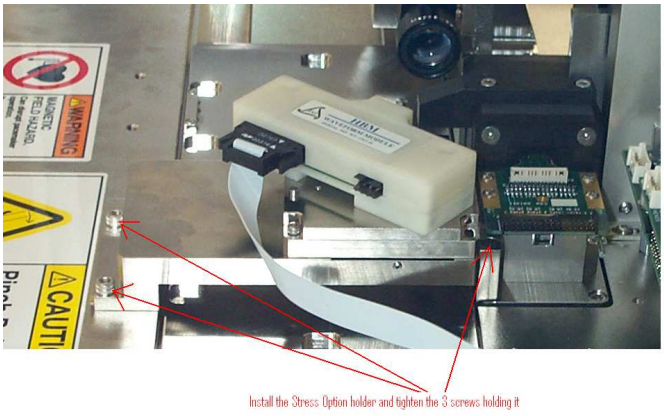


Figure 8-4 EPS-100 BlazerX5 Installation (3)

5. Remove one from bar magnet assembly and install the waveform module holder.



8.2 Monitoring the waveform on Bar HBM/MM

Unlike the standard HBM/MM cartridges, the BlazerX5 HBM/MM don't have connectors for the flex guide cables. Instead the have pogo-pins which connect to the probe card PCB. BlazerX5 HBM/MM waveform modules have a special slot in the enclosure specifically for the CT-6 installation.

Figure 8-5 BlazerX5 HBM/MM – Connecting CT-6

1. To install the CT-6, you have to remove the BlazerX5 waveform module assembly from the base, just as you would when changing the stress probe card (see BlazerX5 User Manual). This is done by removing two screws from the top plate of the assembly.
2. Remove the waveform module from the assembly.

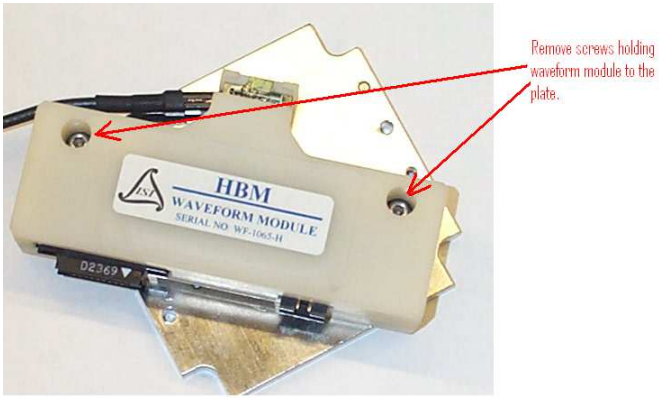


Figure 8-6 BlazerX5 HBM/MM – Connecting CT-6 (2)

3. Remove 4 on the bottom of the pomalux enclosure to take it apart.

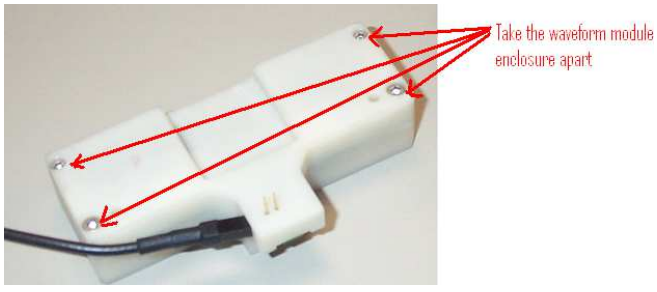


Figure 8-7 BlazerX5 HBM/MM – Connecting CT-6 (3)

4. Install the CT-6 onto the outside pogo pin, such that the green dot on the CT-6 is facing the PCB.

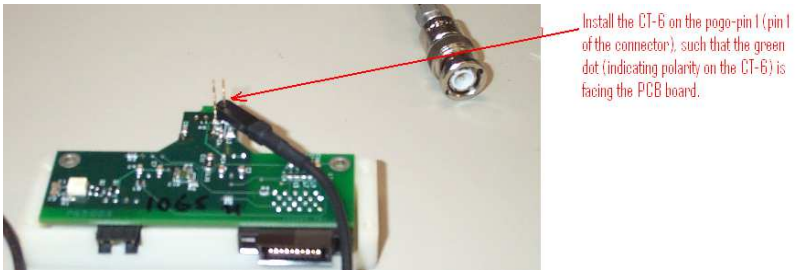

Install the CT-6 on the pogo-pin 1 (pin 1 of the connector), such that the green dot (indicating polarity on the CT-6) is facing the PCB board.

Figure 8-8 BlazerX5 HBM/MM – Connecting CT-6 (4)

5. Put the assembly back together.
6. To avoid damage to the vacuum gripper or to the pogo pin, secure the CT-6 with the tie wrap after the waveform module is installed on the tester.

To monitor the waveform on a real head, you need to load a bar in Barcont, then select "Stress" location, move to a slider on the bar and click "Probe". You can open the EPS-100 main menu from the ESD Sweep Test option, and then fire single pulses using EPS-100.

To monitor the waveform on a resistor probe card, you need to install the dummy (resistor) probe card first and then mount the waveform assembly onto the Blazer. After that you can fire pulses using EPS-100 application. The waveform should comply with HBM/MM standards specified in this manual.

8.3 Changing the Waveform Module

To change the waveform module, first remove the waveform module assembly from stress probe card base and then unscrew the two screws holding the waveform module to the assembly (as shown on the picture below).

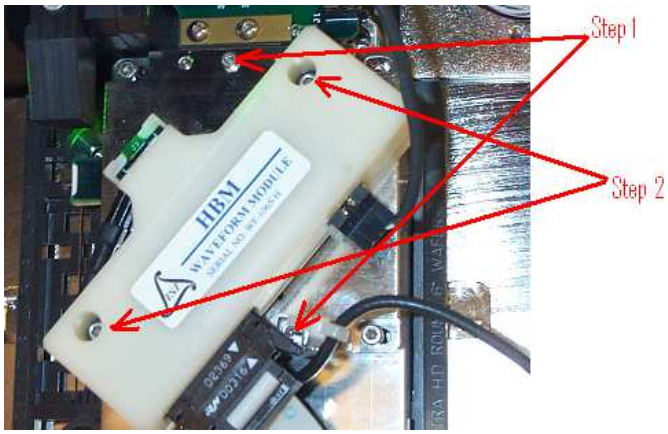


Figure 8-9 Changing the Waveform Module (BlazerX5)

Loosen all 4 screws holding the base with the probe card, as you would when realigning the probe card. You need to do that because different modules will allow access to different probe card alignment screws. For example HBM/MM allows access to left-back, right-back and right-front screw; whereas CDM allows access to righ-back, left-front and right-front screw. You will need to tighten any two screws to hold the probe card base firmly in place.

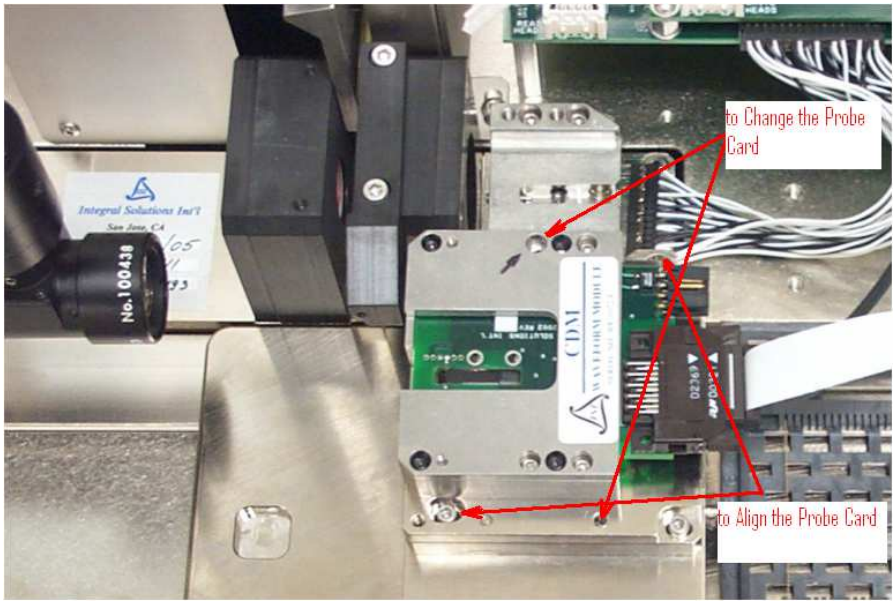


Figure 8-10 CDM Waveform Module (BlazerX5)

Install the waveform module in the opposite order (first install the module onto the assembly, and then install assembly onto the stress probe card base). Note that when changing the module from HBM/MM to CDM or vice versa, you will have to change the screws in Step1 and Step2 with the ones supplied with the module you are attempting to install.

8.4 Software Control Diagram

For Bar ESD Stress option, you need to select "Bar Level" configuration in Quasi97 setup selection screen (instead of QST2002). You also need to enable ESDApp.Application module in the Quasi97 selected modules menu. When running, the ESD Sweep test will tell barcont to move to stress location, then tell EPS-100 to apply ESD voltage, then tell barcont to move to test location and run tests in Quasi97.

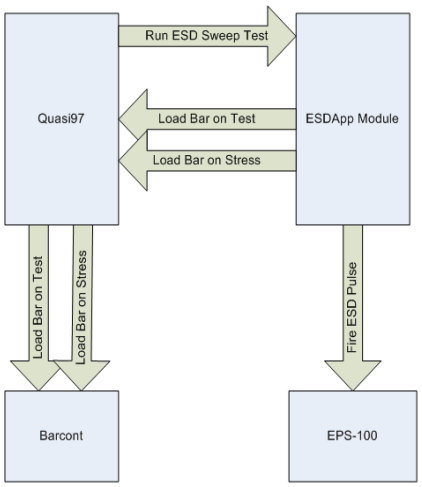


Figure 8-11 Bar ESD Software Control Diagram

The ESD Sweep Test can be enabled in production. For BlazerX5 ESD, this allows to run a full bar in engineering mode and multiple trays of bars in operator mode, without operator input. Be careful not to run ESD sweep test in production if you want to enable logging plots, because Excel file is going to get very big very quickly.

8.5 ESD Probe Card Pin-out

The ESD probe card has only two pins, which are connected to R+ and R- outputs of the waveform module. R+ is the pin that is closer to the magnet, and R- pin is closer to the operator.

For HBM and MM the pulse is discharged through R+ side. For CDM module, the head is charged through R- and then R- side is grounded, and R+ remains floating during discharge. So the active pin is different on CDM vs HBM/MM, but the polarity of the pulse remains the same on all module types.

9. High Field ESD Stress Option

HBM and MM ESD modules are fully compatible with High Field tester, CDM module requires a rework. For more information and operation specifications please refer to QST-2002-HF User's Manual.

10. Contact Information

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